



**COMAC CAL**

**CZECH PRODUCER  
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# **CALOR 38**

## **Communication protocol specification MODBUS RTU**

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### ***Transmission service used***

The master is the primary station which initiates all the messages transfers, the satellites stations are secondary stations which only transmit when they are asked for.

### ***Transmission SPEED***

The transmission speed can be 1200, 2400, 4800, 9600 baud. The transmission is asynchronous RS485 with a start bit, 8 data bits and a stop bit. Default transmission speed is 9600Bd.

### ***Addresses***

The addresses 1 to 255 are reserved for 255 secondary stations.

### ***Request / Response***

#### **Public function code 03h – read holding registers**

The master sends a public function code 03h (Read holding registers), starting address, no. of registers and the address of secondary station.

#### **Basic address space:**

0x00	unsigned long Fabrication No.
0x02	unsigned long energy $\Sigma$
0x04	unsigned long energy under dTmin
0x06	unsigned long energy user (resettable)
0x08	unsigned long volume +
0x0A	signed long flow
0x0C	signed long power
0x0E	signed long inlet teperature x100 (0.01°C)
0x10	signed long outlet teperature x100 (0.01°C)
0x12	signed long teperature diff. x100 (0.01°C)
0x14	unsigned int error code*

#### **Diagnostic Function address space:**

0x15	unsigned long flow raw ADC data
0x17	unsigned long inlet teperature raw ADC data
0x19	unsigned long outlet teperature raw ADC data

**\*Error table code:** Hi Byte = 0  
Lo Byte = error code:

- bit 0 Add volume overflow(unreasonable increment)
- bit 1 FRAM memory error
- bit 2 Empty tube
- bit 3 Imp1 out overflow
- bit 4 Current coil
- bit 5 Imp2 out overflow
- bit 6 temperature measurement
- bit 7 bad CRC

**Request:**

Address	1Byte
Function code (03h)	1Byte
Starting address	2Byte
No. of Registers	2Byte
CRC32	2Byte

**Response:**

Address	1Byte
Function code (03h)	1Byte
Byte count	1Byte 2 x N*
Register value	N* x 2Bytes
CRC32	2Byte

\*N = Quantity of Registers

**Error:**

Address	1Byte
Error code (83h)	1Byte
Exception code	1Byte
CRC32	2Byte

***Example of a request to read energy and volume registers 02h – 09h:***

**Request:**

Address	01h	
Function code	03h	
Starting address Hi	00h	
Starting address Lo	02h	( energy $\Sigma$ )
No. of Registers Hi	00h	
No. of Registers Lo	08h	
CRC32 Hi	E5h	
CRC32 Lo	CCh	

**Response:**

Address	01h	
Function code	03h	
Byte count	10h	
Register value Hi	xxh	( energy $\Sigma$ )
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	(energy under dTmin)
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	(energy user)
	xxh	
	xxh	
Register value Lo	xxh	
Register value Hi	xxh	( volume + )
	xxh	
	xxh	
Register value Lo	xxh	
CRC32 Hi	xxh	
CRC32 Lo	xxh	

Resolution units in the registers is given from resolution of LCD display.

Example:	LCD	Register
	53.4 GJ	534
	689,89 L	68989
	5,6 m3/h	56

***Illegal data address***

Memory address spaces 0xFE00 through 0xFFFF are system registers, for the routine user are blocked.

***Communication timing***

